

A CONTRIBUTION TO THE PATHOLOGICAL ANATOMY OF PLAGUE
IN GREAT GERBILS UNDER NATURAL CONDITIONS

AD 652662
767-62038

Translation No. 1682

APRIL 1966

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[Following is the translation of an article by L. A. Peysakhis, K. M. Muminov, G. Yu. Pak, L. T. Bykov, L. V. Krasnikova, and V. A. Zaytsev, published in the Russian-language periodical Materialy Nauchnoy Konferentsii po Prirodnoy Ochagovosti i Profilaktike Chumy (Materials from the Scientific Conference on the Natural Focality and Prophylaxis of Plague), Alma-Ata, Chimkent, Feb., 1963, pages 181--183. Translation performed by Sp/7 Charles T. Ostertag, Jr.]

Over a period of five years, while taking an indirect part in the study of the natural focality of plague in Mryun Kum (Chu-Talas inter-fluvial area), we undertook the mission to analyze the data on the encounterability of pathologoanatomical changes in plague infected great gerbils and to compare the results obtained with the ability to isolate the plague microbe from their organs.

This type of work was justified by the fact that on the one hand it helps in the practical work of the doctor--epizootologists, and on the other hand, it is possible that it will supplement our knowledge on the pathogenesis of plague in great gerbils.

→ The pathologoanatomical picture was studied by us in 182 naturally infected great gerbils. Of these, in 12% a generalized form of plague with the presence of septicemia was recorded, and in 88% a local form of infection was noted. In the latter the plague microbe was isolated only from the liver in 9%, only from the spleen in 44%, simultaneously from both organs in 28%, from the adrenal glands in 0.5%, and by means of only a biological test -- in 3% of the cases.

Of the plague infected gerbils, 45% were found to be without any pathological changes. Among these adult females comprised 51%, adult males -- 28%, and young animals -- 21%. The cultures of plague microbe were isolated from them only by means of a biological test in 10%, from the liver -- in 9.0%, from the spleen -- in 48%, from the liver and spleen simultaneously -- in 22%, and from the organs and the blood simultaneously -- in 11% of the cases. It must be stressed that we did not succeed in exposing a direct dependency of the frequency of encounterability of plague stricken gerbils without pathologoanatomical changes on the form of the disease (local or generalized) or the intensity of growth of the causative agent on solid media. Also no dependency was exposed on the frequency of encountering plague

stricken gerbils without apparent pathologoanatomical changes in the organs on the season of their detection.

Pathologoanatomical changes were found in 100 (55%) gerbils. Mainly these were necrotic changes in the organs (98%); less often enlargement of the lymph nodes is encountered (19%), commissures between the internal organs (11%), and still less often -- abscesses in the internal organs (4%) and buboes (1%).

Necrotic changes were encountered only in the liver of gerbils in 19%, only in the spleen -- in 36%, simultaneously in both of these organs -- in 43%, and in the lungs -- in 2%. These changes had the nature of focal necroses, had various dimensions (from small, hardly discernible points, up to the size of lentils), and were single or multiple. The size and number of foci of necroses did not depend on the intensity of seeding out of the causative agent from the organs.

During the septic form of plague in great gerbils, necrotic changes are encountered both in the liver and in the spleen, more often (31%) in both organs simultaneously. The same is observed also during the isolation of the causative agent simultaneously from the liver and the spleen, with the absence of it in the blood (36.1%). With the exposure of the causative agent only in the liver or spleen, necrotic changes were recorded most often in these organs (26--35%), but in a number of cases were observed in others or in several simultaneously. When the cultures of plague microbe were isolated only by means of a biological test, necrotic changes as a rule were encountered simultaneously in the liver and spleen (36%).

In a number of cases, in spite of the presence of necrotic changes in the organs of great gerbils, it was not possible to isolate a culture of the plague microbe.

The absence of pathologoanatomical changes in great gerbils by no means testifies that in a concrete territory there are no sporadic cases of plague morbidity among these animals, or acute outbreaks with the presence of local or generalized forms of infection. Along with this, the presence in great gerbils of macroscopic changes which are specific for plague (enlargement of lymph nodes, necroses, abscesses, sharp enlargement of the spleen) in the majority of cases indicates the circulation of the causative agent of the infection in the population of the animals. Here, necrotic changes in the organs should be considered as the leading sign of an acute form of plague in great gerbils in all phases of the epizootic process.

Necrotic changes in the organs of great gerbils which are stricken with plague represent a species pathogenetic peculiarity of this infection and are not evidence of lingering forms of it, as is indicated in a number of

manuals on the epizootology of plague (Rall, 1958; Fedorov, Rogozin, Fenyuk, 1955). One cannot judge on the intensity of seeding out of the causative agent, based on the presence and intensity of the necrotic changes in any one organ or in several organs simultaneously. The localization of necrotic changes in plague stricken great gerbils in any organ is not a reliable sign of the presence of the causative agent primarily in this organ.

The presence of abscesses in the internal organs (liver, lungs, spleen, adrenal glands, etc.), commissures between them, and suppurating lymph nodes testifies most often of all to a resolving, and in certain cases, it is possible, to a lingering form of plague in gerbils.